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Session 2

# Task Team Progress Report for March 2024 to October 2025 – GNSS-PW

*(Submitted by Kalev Rannat and Jonathan Jones)*

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**Summary and Purpose of this Document**

Progress report from the task team on GNSS Precipitable Water (GNSS-PW).

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## Summary

The TT has worked on the tasks left after ICM15.

- TT5: Comparison of GNSS and radiosonde GDPs
- TT6: Uncertainty of the GNSS GDP
- TT7 GNSS-PW data product serving (NetCDF files)

TT5 and TT6 are still in progress, TT7 (NetCDF) should get closed and approved at ICM-16.

## Task team composition / structure

| Name | Affiliation |
|---|---|
| Kalev Rannat (co-chair) | Tallinn University of Technology, EE |
| Jonathan Jones (co-chair) | Met Office, UK |
| John Braun | UCAR, USA |
| Galina Dick | GFZ Helmholtz Centre for Geosciences, Potsdam, Germany, DE |
| Gunnar Elgered | Chalmers University, SE |
| Rosa Pacione | E-GEOS, IT |
| Yoshinori Shoji | University of Tokyo, JP |
| Jens Wickert | GFZ Helmholtz Centre for Geosciences, Potsdam, Germany, DE |
| George Liu | Hong Kong Polytechnic University, HK |
| Olivier Bock | IGN, FR |
| Hannes Keernik | University of Tartu, EE |
| Florian Zus | GFZ Helmholtz Centre for Geosciences, Potsdam, Germany, DE |
| Tzvetan Simeonov | DWD, DE |

## Progress on main tasks

### TT5: Comparison of GNSS and radiosonde GDPs

It was planned (for TT, LC and T.Simeonov, with initial deadline October 2024), that the GNSS TT provides a paper on the comparison between radiosonde and GNSS GDPs, includes additional results as discussed at ICM-15 around co-location uncertainty estimation and possible insights around causes of systematic offsets. The task is not completed. T.Simeonov (DWD) has got different tasks from

DWD and couldnt continue on TT5. However, the team at GFZ has made new comparisons with sup-port from O. Bock. The results will be presented at the next ICM and a paper will be drafted right after.

### TT6: Uncertainty of the GNSS GDP

GNSS TT has taken an obligation (planned deadline March 2025) to review the TD for the GNSS GDP and to reassess the uncertainties on the IPW GDP. Based upon this review should be decided if it is necessary to reprocess GRUAN GNSS data with updated knowledge to have a version2 of the GDP.

The task is not completed. The review is in progress, the tasks/responsibilities are shared, the intermediate status will be presented at ICM.

### TT7 GNSS-PW data product serving (NetCDF files)

It was planned (LC and TT):

- to finalise production of NetCDF format files including reprocessing of GDP for GRUAN sites
- to agree on the NetCDF format with LC and then provide the NetCDF GDP to the LC by July/summer 2024.

The updated convertor is ready. Discussion with Michael Sommer is planned next week for finishing the operational provision of PW GDP in NetCDF. After this it could be approved at ICM (if we don't start to wait until the NetCDF itself gets upgraded to netCDFv5...).

TT has a clear position, that endless tuning of the metadata to an ideal outlook (without knowing what exactly it should be, and remembering that nobody has published any GNSS NetCDF-standard data before, GRUAN being the first) is useless and only delays the publication of the GDP. Instead, the GDP could be published with its first version and upgraded to the next version later, if really neces-sary.

## Relevant activities not covered by tasks

GFZ is continuously searching/supporting new GRUAN GNSS sites.

The TT members have activities in Geodetic communities:

- International Association of Geodesy, JWG C.7: Ground-GNSS trends for climate models,

- International Association of Geodesy, JWG C.8: Optimal processing and homogenization of GNSS-PW climate data records (chaired by O. Bock and G. Dick). This JWG works in direct support to the GRUAN TT GNSS. It aims at understanding the sources of uncertainty in GNSS PW estimates and reducing them at the processing and post-processing levels.

TT members are active in COST Actions: CA24155 (CRIM) - Climate Reference Instruments and Measurements (Upper-air, Column and Near Surface)

## Governance / Terms of reference

The ToR needs to be revised (the process is started, but needs time to find consensus for the new and actual goals). The current version is outdated as some of the milestones are reached and other need to get updated according the state-of-the-art today.